

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5**

Date: September 3, 2010

Subject: Matthiessen and Hegeler Zinc Company Site – Illinois EPA Review of the Little Vermilion River Data and Findings

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To: GeoSyntec Consultants

U.S. EPA requested the assistance of the Illinois EPA in the review of the May 2010 Remedial Investigation and Ecological and Human Health Risk Assessment Reports and more recently, the portion of the Ecological Risk Assessment that dealt specifically with the Little Vermilion River and the report's conclusions. Based upon Illinois EPA's review, the following was submitted to U.S. EPA and warrants further discussion with GeoSyntec. This memo is being provided in order to facilitate these discussions.

Review of “Draft Report – Biological assessment of the Little Vermilion River adjacent to Matthiessen and Hegler Zinc Company, LaSalle, Illinois”.

1. Appendix A: Field Sampling Plan is missing.
2. Page 1: I'm not sure how this study can determine “any potential adverse effects that may have occurred over time to the aquatic community”, if no samples were taken before whatever happened – happened.
3. Page 9 & 10: Section 2.4, last sentence on page “Furthermore, at the request of U.S.EPA (i.e., SulTrac), each of the four selected Little Vermilion River reaches were longitudinally divided into east and west halves, generally delineated by the stream thalweg. *Separate aquatic habitat assessments were performed* to identify habitat types present and the IEPA 20-jab method protocol was applied to both the east and west halves of the river.
(I'm not sure why SulTrac recommended dividing the Station habitat into an east and west section-it would be helpful to read the Field Sampling Plan). No separate aquatic habitat assessments were performed for the east and west halves. The completed QHEI sheets represent each station in its entirety. And how exactly was the IEPA 20-jab method applied to both halves of the river (see below under Macroinvertebrates)?

Habitat/QHEI:

1. No maps were drawn – see back of QHEI form.
2. The QHEI form used in this survey is a different version compared to what IEPA uses. We use form EPA 4520, 06/24/01. Two differences I can immediately think of are Metric 3 of IEPA's form does not include “Impounded”, and Metric

- 4 of IEPA's form does not include "Very Wide" as a riparian width option. The difference is +1 in terms of scoring. Why was the QHEI the only habitat form used? Why were IEPA's other habitat forms not used? (see attached)
3. There are no photographs of CAR004. Was this the only section of stream not previously channelized?
 4. CAR001 page 16, Physical Stream Habitat Conditions: were the pools wider than the riffles? If yes, than it should be stated as it is for CAR002, Page 17. See QHEI sheets, Metric 5.
 5. QHEI: Metric 1 for ALL stations is incorrect – only the two most dominate substrate type boxes are supposed to be checked, percents of other substrates present are not listed, and the Number of Substrate Types refers to High Quality Substrate having a score of 5 or > is checked for all stations, thus leading to an elevated score for this metric. Also, in Section 3.1.1: Physical Stream Habitat, the number of High Quality of Substrate Types is incorrectly referred to & not documented on the QHEI form. Example, page 16, CAR001: "This reach contains four or more substrate types.....(how can we know this if it is not correctly documented on QHEI – and are those four or more substrate types "High Quality"?).
 6. QHEI: Metric 2 was incorrectly calculated for all stations.
 7. QHEI: Metric 3 – under Modifications/Other, the boxes for "one side channel modifications" and/or "bank shaping" were checked for all of the stations. Please describe these modifications.
 8. QHEI: Metric 4 was incorrectly calculated for CAR003.
 9. QHEI: Metric 5 – was CAR004 the only station that did not have a "fast" velocity?
 10. Metric 6: How was the Gradient (feet/mile) calculated and why was this left blank on every form?

Macroinvertebrates:

1. These sections are not clear: 2.4, 3.3, 4.2, & 4.4.
How were the 20 jabs allocated at each station? How many Bank & Bottom Zone jabs? What habitat types were jabbed & how was this determined? Were the stations "over sampled" if both banks were sampled separately? Example, if Station CAR001 is 45 feet wide, there should have been 6 bank zone and 14 bottom zones jabbed for the entire station. If the Station was divided longitudinally, and each half was approximately 22.5 feet wide, were the 20-jab re-allocated to represent a smaller stream width so 8 bank and 12 bottom zone jabs were collected from each side? Was a field book used to document jab allocation? Within the Bottom zone– how many coarse, fine, plant detritus and

vegetation, and within the Bank zone – how many submerged terrestrial vegetation, submerged tree roots, and brush debris jams were collected at the east and west halves of each station? And how was this determined and why is this information not presented in the document?

In the Biological Assessment Summary, Page 32, Section 4.2, “the total number of macroinvertebrate taxa observed within each sample reach was high, and in many cases, the number of taxa observed exceeded IEPA’s best value of 46 taxa. The mIBI scores for each sample location exceeded the IEPA threshold value of 41.8, thus firmly indicating “no impairment” and full support of designated aquatic life use...

The total number of mIBI taxa at each station was incorrectly calculated. Geosyntec included Hemiptera, Lepidoptera, Cladocera, and air breathing insects. However it is stated on page 10, (2.4.1 Macroinvertebrate Data Management and Analysis), “Organisms/taxa that are not considered fully aquatic were omitted for the analysis also per protocol”. Because this is a brief and quick review, I recalculated the total taxa for each site and came up with the following:

	<u>IEPA Taxa Count</u>	<u>Geosyntec Taxa Count</u>
CAR004 West	41	53
CAR004 East	38	47
CAR003 West	44	52
CAR003 East	32	40
CAR002 West	30	34
CAR002 East	39	49
CAR001 West	41	49
CAR001 East	29	35

In reviewing the recalculated number of taxa, the number of taxa did NOT exceed IEPA’s best value of 46 taxa at any Stations in this study. Because the number of taxa has changed, the metrics will have to be recalculated. Also, keep in mind, we do not know where the jams were collected, some habitats may have been over samples and at the same time other habitats may have been under sampled, thus leading to erroneous results and overreaching statements.

Additional IEPA Reviewer's Comments

I have serious concerns about potential undersampling of the fish assemblage in each sampling reach. The total number of fish captured in each reach is atypically low and close to the lower limit of requiring adjustments in how the fish IBI is scored. The report makes no mention of this potential concern even though the IBI documentation states, "Nonetheless, until the accuracy and precision of metrics and IBI scores is more fully studied for Illinois streams, we tentatively adopt Lyons' (1992) 'rule of thumb'. Specifically we recommend that fish sampling include an area of stream or level of effort large enough to capture at least 50 individuals and preferably more, if practical." Also, the report repeatedly misquotes the Illinois EPA fish-IBI documentation and incompletely represents how Illinois EPA assesses attainment of Aquatic Life Use for Illinois streams.

Given the known past history of environmental degradation in lower Little Vermilion River, valid interpretation of the biological-survey results requires explicit consideration of the burden to demonstrate that the stream is no longer experiencing signs of degradation. This perspective requires that careful attention be paid to multiple aspects of the biological information, not merely to total IBI scores. The report does not sufficiently address the appropriate scientific burden. Rather, the report paints the best possible picture of the biological data simply by concluding that a fish IBI score above 41 is sufficient evidence of lack of degradation. Also, the report fails to validly interpret the result that IBI scores did not differ meaningfully among the four sampling reaches. The report states that it has "*demonstrated that the slag pile and/or other discharges...are not causing specific or significant effects to the ecological health of the fish community.*" This conclusion is not scientifically valid, especially when considered in light of past degradation at this location. Moreover, it lacks validity because it does not address the fundamental scientific principle that one cannot prove the lack of an effect based on only a single, simple study.

Overall, the errors in the macroinvertebrate-IBI calculations, the errors in the QHEI calculations, the incomplete information about the macroinvertebrate sampling, the likely undersampling of the fish assemblages, the insufficient attention paid to addressing the appropriate scientific burden of proof, and the incomplete or inaccurate representation of related documentation collectively and seriously undermine the scientific validity of this report and its conclusions.